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ABSTRACT

Presented is a checklist for use by science coordinators, school principals, science supervisors, and teachers to identify strengths and weaknesses of science programs in grades kindergarten through six. It can also be used by science coordinators during school visits. This guide contains space for recording information concerning: school name and country; visitation date(s) and number; purpose(s) of visit; name(s) of individual(s) with whom briefing was held and recommendations; teachers, specialists, and administrators visited; observations of science program management; science budget; library and media center; computer program in science; science curriculum guides; K-6 learning and time allocation guides; teaching staff; adopted textbooks; teachers of science inservice program; North Central Association evaluation; school improvement plan; standardized testing program; general observations and recommendations; name of person with whom out-briefing was held; and comments. To aid the user, a list of references cited in context is provided in the appendix. These documents include: (1) a memorandum on quality program indicators; (2) an administrators' guide; (3) science objectives; (4) K-6 learning and time allocation guide; and (5) an approved textbook listing. (RT)

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DEPARTMENT OF DEFENSE DEPENDENT SCHOOLS PACIFIC

ELEMENTARY SCHOOL SCIENCE EDUCATION PROGRAM EVALUATION GUIDE

SY88-89

EDITION ONE

JUNE 1988

Revision Dates

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(01) INTRODUCTION

The Checklist is intended for use by the DoDDS-Pacific science coordinator, school principals, science supervisors and teachers in identifying strengths and weaknesses of their science programs in grades kindergarten through 6. The guide is also used as a notebook by the science coordinator during school visits. Wherever possible, references have been cited in context so that users may, if necessary, consult the supporting documents. A list of those references is provided in category (02) below and the relevant documents are included sequentially in the Appendix.

(02) LIST OF SUPPORTING DOCUMENTS

01. ETG/635-3001/303-5 Memorandum Quality Program Indicators, of 87MAR23.

02. DS Manual 2005.1, Administrators' Guide, section 402.

03. DS Manual 2200.1, Science Objectives for 1985-1992.

04. DS Manual 2000.8, K-6 Learning & Time Allocation Guide. of 85DEC.

05. ERH/635-2267/303-11 Memorandum Approved Textbook Listing, of 87AUG11.

(03) SCHOOL AND COUNTRY

(04) VISITATION DATE/S AND NUMBER

(05) PURPOSE/S OF THE VISIT

1.

2.

3.

(06) IN BRIEFING

1. Name/s of individual/s with whom the briefing was held:

2. Quality Program Indicators (ETG/635-3001/303-5 Memorandum of 87MAR23) identified by the school administrator as those upon which he or she would like the evaluation to focus:

   a.

   b.

   c.

   d.

3. Previous Visit:

a. Date: _____

b. Recommendations for improvement made as a result of the previous visit:

(01) _____

_____

(02) _____

_____

(03) _____

_____

(04) _____

_____

(05) _____

_____

(06) _____

_____

c. Actions taken on the recommendations for improvement:

(01) _____

_____

(02) _____

_____

(03) _____

_____

(04) _____

_____

(05)_____

_____

(06)_____

_____

d. Notes:

(01)_____

_____

(02)_____

_____

(07) TEACHERS, SPECIALISTS AND ADMINISTRATORS VISITED

1. NAMES/RESPONSIBILITIES NAMES/RESPONSIBILITIES

a._____ n._____

b._____ o._____

c._____ p._____

d._____ q._____

e._____ r._____

f._____ s._____

g._____ t._____

h._____ u._____

i._____ v._____

j._____ w._____

k._____ x._____

l._____ y._____

m._____ z._____

2. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

3. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

e. _____

_____

_____

(08) SCIENCE PROGRAM MANAGEMENT

1. General Observations:	Yes	No
a. Program Administration.		
(01) A science supervisor coordinates the science program.	_____	_____
(02) A science supervisor has full administrative responsibility for the science program except teacher evaluation.	_____	_____
(03) Supervision of the science program is done by regular school administrators.	_____	_____
(04) Supervision of the science program is judged to be adequate.	_____	_____
(05) Administrative support of the science program is adequate.	_____	_____
b. Curriculum Coordination:		
(01) There is vertical coordination in the program from grade to grade.	_____	_____
(02) There is horizontal coordination among teachers at the same grade level.	_____	_____
(03) Repetition in course content is limnited from year-to-year except where it is planned.	_____	_____
(04) Teachers have an opportunity to plan with other teachers;		
(a) in the same grade.	_____	_____
(b) teaching different grades.	_____	_____
c. Decision-making Process in the Science Program:		
(01) Teachers have frequent opportunities for staff input on the science program.	_____	_____

(02) Teachers have great independence in developing their science classes. _____:_____

(03) Teachers have few opportunities to influence the science program. _____:_____

2. Name of the science supervisor: _____

3. Number of teachers of science: _____

4. Frequency of science meetings: _____

6. Notes:

a. _____

_____

b. _____

_____

7. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

(09) SCIENCE BUDGET

(DS Manual 2005.1, Administrators' Guide, section 402):

1. Dollar Amount: _____

a. Consumable Materials: _____

b. Equipment: _____

c. Library Materials: _____

d. Science Kit Refills: _____

e. Textbooks: _____

2. Name of Person Who Drafts the Budget: _____

3. Process Used When Drafting the Budget: _____

_____

_____

_____

_____

_____

4. Yearly Budget Deadline as Set by the Administration: _____

5. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

6. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(10) LIBRARY AND MEDIA CENTER

1. General Adequacy: The presence of sufficient and appropiate science books, student periodicals, professional science teaching periodicals and science media programs to carry out the conditions of the curriculum is essential to a good science education program. All of these items should be matched as closely as possible with the science program objectives and teaching methods required by the curriculum. Versatility, intended use, the user, and application to student investigations must be considered in assessing the appropiateness of existing library and media center inventories to adequately support the science education program as well as new purchases in the area of science.

To assess the general adequacy of the science library and media center portion of the science program, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
_ {_} Sufficient library books and media programs are available to support all activities and topics in the classes offered.	_ {_} All necessary instructional resorces including audio visual resources related to the science curriculum are available in the media center.	_ {_} Full use is made of instructional media to supplement science learning in the classroom.
_ {_} An annual budget provides for the purchase of science books and media programs.	_ {_} Equipment and library materials provided for in the in the curriculum plan are available to individuals for use when conducting investigations.	_ {_} Lists of science media programs held by the media center are available for teacher use.
		_ {_} There is an on going program conducted by media specialist to evaluate the currency of science books and media programs.

2. Books:

a. Approximate Number of Science Books Held: _____

b. Are the Science Books Well Distributed Across All Science Areas?_____

_____

3. Reference documents_____

a. Professional Periodicals in Science Areas:

(01) Number:_____

(02) Names:

(a)_____

(b)_____

(c)_____

(d)_____

(e)_____

(f)_____

b. Student Periodicals in Science Areas:

(01) Number:_____

(02) Names:

(a)_____

(b)_____

(c)_____

(d)_____

(e)_____

(f)_____

4. Audio/Visual/Media Materials:

a. Number of Programs:_____

b. Distribution across the science areas:_____

_____

5. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

6. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(11) COMPUTER PROGRAM IN SCIENCE

1. Software:

a. Number of science software programs held by the school: _____

b. Is the software compatible with the computers? _____

_____

c. Is the software well distributed across the science areas?_____

2. Apple IIGS Program:

a. Are Apple IIGS computers part of the science program?_____

b. How many computers are used in the program?_____

c. Ways in which the computer/s is/are used:

(01)_____

(02)_____

(03)_____

(04)_____

3. Notes:

a._____

_____

b._____

_____

c._____

_____

4. Observations/Recommendations for Improvement:

a._____

_____

_____

b._____

_____

_____

c._____

_____

_____

d. _____

_____

_____

(12) SCIENCE CURRICULUM GUIDES

(DS Manual 2200.1, Science Objectives for 1985-1992)

1. Is a copy of the current guide available in the school office files? _____

2. Does each science teacher science have a copy of the most recent guide?

_____

3. Guide usage:

   a. How? _____

   _____

   b. When? _____

   _____

4. Notes:

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

5. Observations/Recommendations for Improvement:

   a. _____

   _____

   _____

   b. _____

c. _____

d. _____

(13) K-6 LEARNING & TIME ALLOCATION GUIDE

(K-6 Learning & Time Allocation Guide DSM Manual 2000.8, of 85DEC)

1. Is a copy of the guide available for use in the school office files?_____

2. Are guide wall charts posted where they can be used by:

   a. Administrators_____

   b. Teachers_____

   c. Students_____

   d. Parents_____

3. Does each science teacher have a copy of the guide?_____

4. Is there a relationship between information in the science sections of the guide and content in the various science classes?

5. Notes:

   a._____

   b._____

   c._____

6. Observations/Recommendations for Improvement:

   a._____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(14) TEACHING STAFF

1. General Adequacy. Competency to teach science requires a unique preparation and experience. To reach the optimum performance level, elementary teachers must go well beyond the minimum course work required for certification. They must become involved in professional organizations, read professional journals related to their field and stay abreast of contemporary curriculum recommendations. In addition, qualified science teachers must be able to work cooperatively within a hierarchy of responsibilities to provide a coordinated science program.

To assess the general adequacy of the science teaching faculty, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
{_} All elementery teachers have had training in science and methods of teaching science.	(_) The school has one or more teachers who have an emphasis in science and can act as teacher-leader for teaching science.	(_) A majority of the teachers have at least a Master's degree in elementary education and some have specialized in science education.
{_} All science teachers are familiar with existing major curriculum developments at their grade levels.	{_} A majority of the science teachers have attended at least one professional meeting	{_} All science teachers are active members of at least one professional organization and a majority have participated in the program of one
{_} A majority of the teachers of science		

read regularly one professional journal.

{_} All teachers know appropiate safety practices for conducting laboratory activities at their grade level.

in the past year.

{_} All science teachers can show evidence of having specifically studied major curriculum developments in their teaching area.

{_} Individual teachers have been designated as having specific leadership responsibilities in conducting the science program.

professional meeting.

{_} All science teachers have directly participated in curriculum development, revision or adaptation projects that have been implementated in classroom teaching.

{_} A qualified individual is designated as coordinator of the science program with other staff members assigned to a hierarchy of teaching-leading responsibilities.

---

2. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

4. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

d.

(15) ADOPTED TEXTBOOKS

(Approved Textbook Listing ERH/635-2267/303-11 Memoarndum of 87AUG11)

1. Is the approved list of science textbooks available?

2. Are the approved textbooks being used?

   a. K Addision-Wesley Science, 1984:

   b. 1-6 HBJ Science, 1985:

3. Does each teacher of science have:

   a. A teachers' edition of the approved text?

   b. A teachers' edition of the lab manual?

   c. A set of other publisher generated course support materials?

4. Notes:

   a.

   b.

c. _____

_____

5. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(16) TEACHER OF SCIENCE INSERVICE PROGRAM

1. Is there an on-going inservice program in science education for teachers of science?

_____

2. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

3. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

(17) NORTH CENTRAL ASSOCIATION (NCA) EVALUATION

1. Date of last NCA Report: _____

2. Science related problems identified on the last NCA report:

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

   d. _____

   _____

3. Notes:

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

4. Observations/Recommendations for Improvement:

   a. _____

   _____

   _____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(18) SCHOOL IMPROVEMENT PLAN

1. Are the science education problems identified on the NCA report addressed here?

_____

a. Actions being taken to resolve these problems:

(01) _____

_____

(02) _____

_____

(03) _____

_____

(04) _____

_____

2. Notes:

a. _____

_____

b. _____

_____

3. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(19) STANDARDIZED TESTING PROGRAM

1. What science deficiencies were identified using standardized testing procedures (scores lower than national norms)?

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

2. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

3. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(20) SCHOOL WIDE ACTION PLAN(SWAP)

1. What procedures does SWAP use to correct the science deficiencies identified by the Standardized Testing Program?

a. _____

_____

b. _____

c. _____

d. _____

2. Are the procedures identified in part "1" of this item being implemented?

_____

_____

_____

3. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

4. Observations/Recommendations for Improvement:

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

d. _____

_____

_____

(21) GENERAL OBSERVATIONS/RECOMMENDATIONS

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

4. _____

_____

_____

(22) OUT BRIEFING

1. Name of the person/s with whom the out briefing was held? _____

_____

2. Notes:

a. _____

_____

b. _____

_____

c. _____

d. _____

(23) APPENDIX

This section contains those portions of each memorandum and other document cited in context and listed in the beginning of this publication. They are included here in the same order in which they are listed in the front of the document (see section [02] List of Supporting Documents).

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
FUTENMA BOX 796
FPO SEATTLE 98772-0005

March 23, 1987

PACIFIC
ETG/635-3001/303-5

MEMORANDUM FOR District Superintendents
Principals

SUBJECT: Quality Program Indicators

Attached are the Quality Program Indicators each member of the Education Division has developed to use in program evaluation at the school level.

These indicators are guidelines which identify program qualities that coordinators will be observing when they visit the schools. I suggest that line administrators identify specific program indicators they want a coordinator to examine during an on-site visit, thereby the superintendent or principal will be the instructional leader who determines the direction of program evaluation.

RICHARD T. CAWLEY
Deputy Director

Attachments

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
FUTENMA BOX 796
FPO SEATTLE 98772-0005

October 7, 1987

Dir
DDir
ES
Edu
RS 00064

PACIFIC

ERS/635-3982/303-15

MEMORANDUM FOR District Superintendents
Principals

SUBJECT: Science Quality Program Indicators

1. Dr. Cawley's memorandum, 23 Mar 87, subject: Quality Program Indicators, did not include the indicators for science.

2. The enclosures to this memorandum provide you with the Science Quality Program Indicators. They should be addended to your copy of Dr. Cawley's memorandum.

SIGNED

RICHARD M. SCHLENKER
Science Coordinator

Enclosures
1. Quality Program Indicators Science: Elementary
2. Quality Program Indicators Science: Secondary

cf: District Superintendent

QUALITY PROGRAM INDICATORS SCIENCE: ELEMENTARY

1. Objectives in DS Manual 2200.1 are used in this program.

2. The science program is taught using DoDDS adopted programs. Appropriate teaching time is allotted in all grades to: (a) hands-on activities, (b) areas identified in DS Manual 2000.8.

3. Readiness, basic reteaching and enrichment activities are part of the program.

4. Student progress is evaluated on a regular basis and at the end of the year using more than one method to determine competency with the objectives set forth in DSM 2200.1.

5. Use the following instructional strategies: (a) individualization; (b) hands-on activities involving all students; (c) group instruction; (d) multimedia media presentations.

6. Models are used to demonstrate abstract concepts.

7. School-wide programs are established as follows: (a) science fairs; (b) those which improve the science program based upon standardized test results and the SWAP.

DS Manual 2005.1
February 1988

DEPARTMENT OF DEFENSE DEPENDENTS SCHOOLS

ADMINISTRATORS' GUIDE

402 PLANNING, PROGRAMMING, BUDGETING, AND EXECUTION SYSTEM (PPBES)

A. PLANNING

The planning phase initiates the DoDDS PPBES. DoDDS managers outline goals and objectives which determine the direction and the destiny of their organization annually. These goals and objectives should be for long-term planning as well as short-term and should take into consideration fiscal constraints. For instance, planning should not be limited to those 5 years within the Five Year Defense Plan (FYDP), FY 1990-94. A good example of planning within the educational program is the Seven Year Educational Program Development Plan.

B. PROGRAMMING

During December/January the ODS Fiscal Division will issue a call to the regional directors for program objective memorandum (POM) issues. POM issues are for those programs that are new or for the enhancements of existing programs for which funding does not currently exist within the current FYDP. Issues submitted may cover all DoDDS appropriations: Operation and Maintenance (O&M); Procurement; and Military Construction (MILCON). Regional and ODS division POM issues are consolidated by the ODS Fiscal Division Budget Branch and discussed with the appropriate regional point of contact, the ODS division chiefs, and the Director, DoDDS. A final list of issues are consolidated and submitted to DASD (FSE&S) as a list of unfinanced requirements with the DoDDS POM in April. (Note: POM 90-94 will be submitted in April 1988.) The ODS Fiscal Division prepares each of the issues in the prescribed format outlined in guidance issued by OSD and defends them before the ASD (FM&P). Approved issues become part of issue books that are reviewed by the Defense Resources Board (DRB). The final decision of the DRB is issued as the Program Decision Memorandum (PDM) in late August. Those dollars included in the POM plus any issues approved by the DRB in the PDM become the base line for the Operation and Maintenance Budget Estimate Submission (BES), the Procurement Budget, and the MILCON Budget Submission to ODS/OMB on September 1.

C. BUDGETING

The ODS Fiscal Division will issue guidelines in January or February of each year for procurement budget items and will issue guidelines to govern the development of the regional operation and maintenance budget in March of each year.

For example: In March 1988, the ODS Fiscal Division will request the initial requirements for FY 1990. In accordance with those guidelines, the regional director and his/her staff will assume responsibility for the preparation of the regional budget for ODS review.

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1. Process

Based upon school complex and regional office requirements, each regional director will submit their O&M and procurement budgets to ODS in accordance with the guidance issued by the ODS Fiscal Division. The O&M budget applies to 4 fiscal years: the prior year (PY=FY 1988), current year (CY=FY 1989), budget year (BY=FY 1990) and budget year plus one (BY+1=FY 1991). Emphasis in the preparation of the O&M budget should be given to the budget year and budget year plus one. The prior fiscal year serves as a base for comparison and analysis and as a means to update the current year requirements for budget execution purposes. The DoDDS budget reflects resource requirements and is included as a subelement of the DoD budget and as a separate section of the President's Budget which is presented to Congress each January.

The term "fiscal year" refers to the Federal Government accounting period which starts on October 1 each year and ends on September 30 of the following year. Operation and maintenance funds are available for 1 year only and, therefore, cannot be carried from 1 fiscal year to another. Military construction funds are available for 5 years and procurement funds for 3 years. However, in the case of procurement funds, funds are generally requested in the year in which they are obligated or at least 68 percent are obligated in the first year.

2. Regional Budget Submissions

a. Procurement. Based upon guidance issued by the ODS Fiscal Division in January, all regional directors will submit a procurement budget to the ODS Fiscal Division in March or April each year. Items included must cost $25,000 or more. Submissions must follow those procedures outlined in DS Regulation 4140.2.

b. Operation and Maintenance (O&M). Based upon guidance issued by the ODS Fiscal Division in March of each year, the regional directors will submit their budget requirements as much as 2 years in advance of execution. For example: The initial FY 1990 budget requirements will be submitted to the ODS Fiscal Division in June 1988; FY 1990 will be executed beginning October 1, 1989.

The regional budget submissions include budget exhibits which support requirements in the areas of personnel compensation and benefits, repair and maintenance projects, contractual services, etc. The key budget exhibits are OP-15 and OP-8. The basic formats for these two exhibits are prescribed in the DoD Budget Manual, DoD 7110-1-M. The OP-15 (Budget Summary) presents the DoDDS budget requirements in four broad categories: Administrative Costs; Education Costs; Logistics Costs; and Unique Costs. The OP-8 (Civilian Personnel Costs) presents the costs of

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personnel compensation and benefits according to the various categories of personnel (U.S. Direct Hire--SES/GM/GS, Wage Board, P.L. Teachers; Direct Hire Foreign Nationals; and Indirect Hire Foreign Nationals).

3. Review

Upon receipt of the budget estimates from the regional offices, the ODS Fiscal Division reviews and discusses each document with the other applicable ODS divisions and the Director, DoDDS. Regional budget submissions are also discussed during the Regional Directors' Meeting which is held in July. The ODS Fiscal Division consolidates all of the DoDDS budgetary requirements and submits a Budget Estimate Submission (BES) to OSD in September. (Example: FY 1990 will be submitted to OSD in September 1988.) The BES is submitted in accordance with the guidance issued by ODS (Comptroller) with the fiscal guidance in the FYDP at POM plus any DRB decisions issued in the PDM which is signed by the Secretary of Defense in late August. The Director, DoDDS in conjunction with the Chief, Fiscal Division, ODS and the ODS Budget Officer justify the DoDDS requirements at a joint ODS/OMB hearing. Following the hearing, ODS/OMB issue Program Budget Decisions (PBD) which affect the DoDDS program. The ODS Fiscal Division with the concurrence of the Director, DoDDS either accepts or appeals the decisions. The PBD cycle occurs during the months of October through December. The BES plus any adjustments made during the ODS/OMB review cycle becomes the base line for the DoDDS President's Budget which is submitted to Congress in January. The DoDDS Budget is reviewed by four Congressional committees. They are:

a. Authorization Committees:

(1) House Armed Services Committee

(2) Senate Armed Services Committee

b. Appropriations Committees:

(1) House Appropriations Committee

(2) Senate Appropriations Committee

During Congressional reviews, DoDDS receives general and/or specific questions pertaining to the overall DoDDS program. In addition, the DoDDS Director may be asked to testify at a formal Congressional hearing. The mark-up made by each Congressional committee appears in the Congressional Record and is included as a part of the Defense Agencies section. Congressional committees may make specific reductions against the DoDDS program. Unless specifically noted otherwise, the DoDDS program also may receive pro-rata share general reductions of other Defense Agency items reduced. An appropriation is passed by Congress when an

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agreement has been reached between the Congressional Committees and it has been signed by the President of the United States. If an appropriation has not been passed by October 1, Congress passes a continuing resolution (CR) pending an appropriation. The President also signs the CR. Under the continuing resolution, an agency may operate at prior year levels. No new starts or new programs are permitted under a continuing resolution.

D. EXECUTION

1. General

The overall responsibility for the execution of the DoDDS budget lies with the Chief, Fiscal Division, ODS. Each regional director has the responsibility for executing the budget of his/her region.

The regional budget submission (current year column) serves only as a plan and does not mean that funds are automatically available. The actual amount of funds which may be expended during the fiscal year for the operation of the region are set forth in the Fund Authorization Document (FAD). The FAD is the maximum amount of funds which may be expended for that fiscal year and is subject to the R.S. 1517 violations. The regional director may suballot funds to the Defense General Supply Center (DGSC) at Richmond, Virginia, and may issue funding targets to the District Superintendents Office (DSO) and/or school level.

2. Tuition Collections

It is the policy of DoD to allow the enrollment of non-DoD sponsored minor dependents in DoD dependents' schools provided that space is available and that the applicable tuition is paid in advance. DoD Directive 1342.13 establishes eligibility requirements and priorities for the applicable federally or nonfederally connected enrollments. Tuition rates are established for both federally and nonfederally connected students. The tuition rate charged includes direct cost and indirect DoD overhead costs for personnel service, unfunded benefits, and DoD user charges. The direct cost portion of the tuition is deposited to a prescribed DoDDS appropriation account (regional level) while the indirect portion of the tuition is deposited to the Miscellaneous Receipts Account of the U.S. Treasury. Detailed procedures for tuition collections, deposits, and reporting are outlined in DS Administrative Instruction 7200.2. The direct cost portion which is deposited to the regional level appropriation increases the amount of funds available for that region. Detailed instructions establishing the policies governing the computation and publication of tuition rates are outlined in DS Administrative Instruction 7200.1.

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3. Reprogramming of Funds

Budget reviews should be held periodically in each region as well as in the ODS Fiscal Division during the year of execution to ensure an efficient utilization of funds. Generally, these reviews should be held at the end of 2nd Quarter, at the end of 3rd Quarter, and monthly or more often during the 4th Quarter. However, fund status should be monitored on a monthly basis throughout the fiscal year. Regional directors have the authority to internally reprogram between elements of expense and/or OP-15 line items within their allotted funds. This allows the regional director the flexibility which is necessary to accomplish planned programs and to fund unforeseen requirements. Any funds that cannot be utilized in one region should be available for withdrawal by ODS for allotment to other regions that have high priority requirements.

References:

DoD Directive 1342.13, "Eligibility Requirements for Education of Minor Dependents in Overseas Areas," July 8, 1982.

DS Administrative Instruction 7200.1, "Non-DoD Tuition Program," September 6, 1985.

DS Administrative Instruction 7200.2, "Advance Collection of Tuition Fees and Schedule 9 Reporting," September 9, 1984.

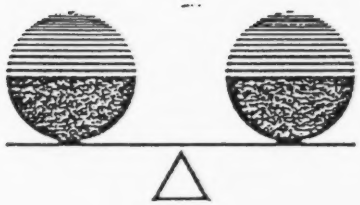
DoD Accounting Manual 7220.9-M, 1983, Part II, Chapter 26, Section D, Reimbursement Rates for Personnel Services.

DoD Instruction 7230.7, "User Charges," January 29, 1985.

DEPARTMENT OF DEFENSE

DEPENDENTS SCHOOLS

SCIENCE OBJECTIVES FOR 1985—1992



Foreword

This manual contains objectives intended to guide the planning, development, implementation, and evaluation of science education in the Department of Defense Dependents Schools (DoDDS). They have been developed with the assistance of DoDDS teachers and administrators who believe that all learners must acquire a realistic and functional understanding of science in order to fully participate in our technologically-oriented society. Teachers are encouraged to use the objectives as guidance for both classroom and school-level planning. The DoDDS science curriculum will be greatly strengthened through the consistent application of these objectives in the conduct of science education throughout the school system. A sincere thanks to all of those who have contributed to the development of this manual.

Steve Motta
Deputy Director

Acknowledgements

The Science Objectives Manual is a completely revised version of DS 2200.1, "Science Goals and Objectives," September, 1978, It is intended to reflect a contemporary approach to science education that emphasizes the learner's need to know and understand the important issues that relate science to society and technology. We appreciate the efforts of the many DoDDS educators who helped develop this current approach to the science curriculum and we, again, thank those who, early on, laid the foundation for this latest edition. We hope that all of these efforts will be translated into science experiences which help our students better understand the nature of science in their lives.

A Science Education Rationale

Science and technology are increasingly influential in our lives. A glance around your classroom or the laboratory should be all that is needed to convince you that these forces have forever changed many aspects of our profession. No one could deny that the discoveries of science have had a sharp impact on the way we think about the world. Somehow it has become a smaller place than we had imagined. The methods of science and technology are now shaping our national problem solving and decision making behavior. Scientists together with highly skilled technicians are now in frequent conversation with elected officials because the issues dealt with are too complex to be resolved by political means alone. The products of science and technology serve our needs but, at the same time, tend to disconcert us. Genetic engineering can deliver a plentiful and inexpensive source of insulin but will all engineered biologicals be so welcome in the future?

The Department of Defense Dependents Schools acknowledges the challenge presented by life in a technological era. It accepts responsibility to help prepare individuals to adapt to accelerated change and continued progress in the fields of science and technology. Accordingly, it has identified those key skills necessary for productive living in today's world and incorporated them into its entire K-12 science program.

Included among the skills that DoDDS chooses to emphasize are problem solving, decision making, evaluating, and application of understandings in a science context.

When equipped with these skills, DoDDS students can more successfully confront the complexity of life in today's world. These skills will help students better anticipate a likely future for themselves - one in which they behave with greater self assurance because they have developed a greater capacity to understand and control their own fate.

Introduction

This statement of science objectives was developed by DoDDS elementary classroom teachers, science teachers, and science coordinators to serve the school system in two major ways:

- As the framework for science instruction, K-12.

- As the basis for evaluating learner outcomes in relation to the following DoDDS science program emphases:

  1. The application of science processes to solve problems, make decisions, and increase understanding.

  2. The utilization of the content and concepts of the biological, physical, and earth/space sciences.

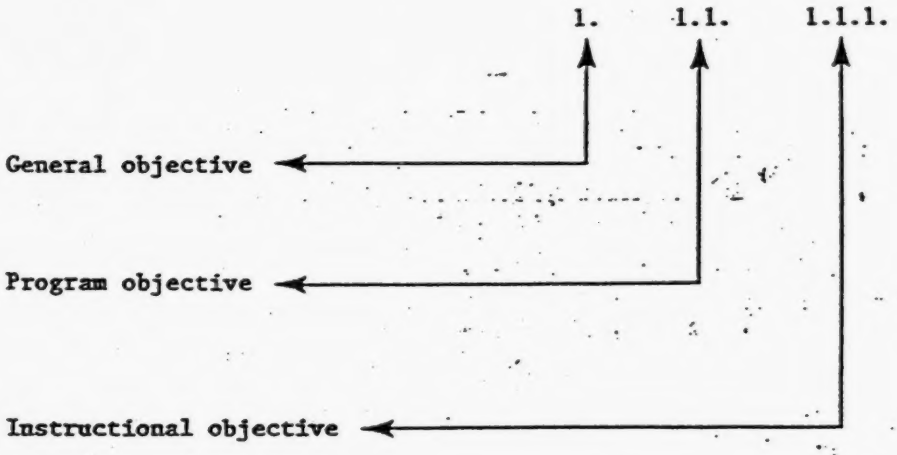
  3. The evaluation of the role of science and technology in society.

  4. The exhibition of scientific behavior in school and everyday life.

To ensure that each of the four program emphases receives adequate support in all grade levels and courses, teachers and administrators are expected to utilize the science objectives when teaching and evaluating the school program and the specific component courses. Where texts alone do not provide adequate support, teachers will rely upon the program and instructional objectives to design appropriate science experiences for students.

Organization and Use

Statements in this document are organized in a hierarchical system in which the most general objectives are identified by single digits while the more specific ones are identified by two or more digits as seen below:



To complete this hierarchy, teachers and principals are encouraged to work together to formulate learner objectives. Learner objectives are foundational; they specify what the student should be able to do whereas the higher level objectives printed in this manual specify what teachers should be emphasizing in the science learning and skill areas.

Each instructional objective in this manual has been analyzed for appropriate grade placement. The results of the analysis are seen in the "E——P" lines opposite each instructional objective. "E" identifies the grade level at which entry level skills can be introduced. "P" marks the grade level where proficiency is expected. Levels can be adjusted on a class by class basis to meet the needs of individual students. The "E" and "P" lines also function to help teachers plan among themselves for the grade placement of particular objectives.

The instructional objectives are samples and are not meant to provide a comprehensive outline of a specific science course.

XXXX

Evaluate science processes to solve problems, make decisions, and increase understanding.

1.1 ACQUIRE INFORMATION THROUGH OBSERVATION AND MEASUREMENT.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.1.1 (K-4) Observe and report about an object or event using more than one sense.	E				P								
1.1.2 (K-8) Observe objects and events by counting, comparing, estimating, or measuring in metric units.	E								P				
1.1.3 (3-8) Identify appropriate methods of measurement for a given task.				E					P				
1.1.4 (5-8) Report observations of an object or event in at least two ways (charts, graphs, tables, verbal, written narrative, etc.)						E			P				
1.1.5 (4-12) Discuss the possibility for error in any measurement.					E								P
1.1.6 (4-12) Select tools appropriate to the phenomenon being studied (for example, thermometer, computer).					E								P

1.2 USE APPROPRIATE RELATIONSHIPS TO ORGANIZE INFORMATION.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.2.1 (1–4) Describe the location of an object within its immediate environment.		E			P								
1.2.2 (1–8) Identify properties useful for classifying objects.		E							P				
1.2.3 (2–10) Develop a classification key using observable differences.			E								P		
1.2.4 (5–8) Use angles and compass headings to communicate directions.						E			P				
1.2.5 (3–9) Describe changes in position, size,				E						P			
1.2.6 (6–12) Describe motion relative to stationary and moving objects.							E						P
1.2.7 (8–12) Describe location in terms of three dimensions and time.									E				P

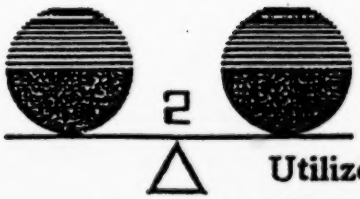
1.3 UTILIZE FACTS IN INFERENCES, HYPOTHESES, AND PREDICTION.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.3.1 (2-8) Make predictions based on measurements.			E						P				
1.3.2 (1-6) Make predictions from tables or graphs.		E					P						
1.3.3 (3-6) Distinguish between an observation and an inference drawn from that observation.				E			P						
1.3.4 (4-12) Distinguish between relevant and irrelevant information.					E								P
1.3.5 (4-10) Identify the hypothesis or question being tested in a given experiment.					E						P		
1.3.6 (5-10) Formulate an hypothesis as an "if-then" statement.						E					P		
1.3.7 (5-12) Evaluate the reliability of a prediction.						E							P
1.3.8 (8-12) Distinguish between probable and less probable inferences.									E				P

1.4 GENERATE INFORMATION THROUGH FORMULATING QUESTIONS IN A SCIENTIFIC MANNER, MANIPULATING AND CONTROLLING VARIABLES, AND DESIGNING AND CONDUCTING RESEARCH.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.4.1 (K–8) Give examples of cause and effect relations.	E								P				
1.4.2 (2–6) Answer a scientific question by collecting and examining-ing data through direct experience.			E				P						
1.4.3 (4–8) Formulate a question that can be answered by science activity.					E				P				
1.4.4 (4–7) Identify a variable which is deliberate-changed in an experiment.					E			P					
1.4.5 (5–8) Identify the variables which are controlled or held constant in an experiment.						E			P				
1.4.6 (7–10) Identify examples of experiments which require large sample sizes and/or many trials to be valid.								E			P		
1.4.7 (7–12) Evaluate the use of mental or computer models to explain phenomena.								E					P
1.4.8 (8–12) Design research to answer a scientific question.									E				P
1.4.9 (7–12) Identify the role of probability and chance in cause and effect situations.								E					P
1.4.10 (9–12) Evaluate a plan for answering a scientific question.										E			P

1.5 Develop critical thinking skills through problem solving.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.5.1 (K-9) State the problem (s) in a given situation.	E									P			
1.5.2 (2-5) List a sequence of steps to solve a problem.			E			P							
1.5.3 (3-12) Evaluate effectiveness of alternative solutions to problems.				E									P
1.5.4 (4-6) Acquire and verify data by comparison.					E		P						
1.5.5 (6-9) State the problem(s) in different ways.							E			P			
1.5.6 (6-12) Analyze information for relevancy.							E						P
1.5.7 (7-12) Use various methods to interpret data.								E					P

1.6 COMMUNICATE THE INTERPRETATION OF DATA.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.6.1 (4-7) State the question and conclusions of an investigation.					E			P					
1.6.2 (4-8) Use graphs to present information.					E				P				
1.6.3 (7-10) Evaluate the presentation of a research project.								E			P		

1.7	UNDERSTAND THE PERSONAL NATURE OF SCIENCE.	K	1	2	3	4	5	6	7	8	9	10	11	12
	1.7.1 (K–12) Identify activities of people who work in science.	E												P
	1.7.2 (K–4) List careers in science and technology.	E				P								
	1.7.3 (K–12) Identify scientists and their contributions.	E												P
	1.7.4 (5–9) Explore job entry requirements of careers in science and technology.						E				P			
	1.7.5 (5–12) Name science-related behaviors that are important for citizens.						E							P
	1.7.6 (7–12) Give examples of the interactions of a scientist and society e.g., Galileo or Einstein.								E					P
	1.7.7 (7–12) Describe the creative nature of scientific activity.								E					P



Utilize the content and concepts of the biological, physical, and earth sciences.

2.1	KNOW THE STRUCTURE, FUNCTION, AND BEHAVIOR OF REPRESENTIVE LIFE FORMS.	K	1	2	3	4	5	6	7	8	9	10	11	12
	2.1.1 (K-4) Distinguish living from non-living things.	E				P								
	2.1.2 (K-12) Practice good health habits.	E												P
	2.1.3 (3-7) Summarize the life functions that distinguish living from non-living things.				E				P					
	2.1.4 (2-5) Identify major structural and functional characteristics of plants and animals.			E			P							
	2.1.5 (3-6) Describe adaptions of plants and animals.				E			P						
	2.1.6 (4-7) Know the elements of human nutrition.					E			P					
	2.1.7 (5-7) Describe how plant and animal cells, tissues, and systems function to maintain life.						E		P					

2.1 (Continued)	K	1	2	3	4	5	6	7	8	9	10	11	12
2.1.8 (4–7) Describe different types of growth, development, reproduction, and life cycles in plants and animals, including humans.					E			P					
2.1.9 (7–10) Describe survival behavior patterns of animals, e.g., migration, territoriality, etc.								E			P		

2.2 UNDERSTAND THE PRINCIPLES OF EVOLUTION AND HEREDITY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.2.1 (3–7) Identify those characteristics of living things that are inherited.				E				P					
2.2.2 (4–7) Discuss similarities and differences among related individuals.					E			P					
2.2.3 (6–10) Apply the theory of heredity to predict the characteristics of offspring.							E				P		
2.2.4 (5–8) Know the broad features of fossil succession in the geologic record.						E			P				
2.2.5 (7–10) Compare scientific theories that explain the means by which plants and animals have evolved over time.								E			P		

2.3	UNDERSTAND THE INTERACTION OF PHYSICAL AND BIOLOGICAL ELEMENTS OF THE ENVIRONMENT.	K	1	2	3	4	5	6	7	8	9	10	11	12
	2.3.1 (1–4) Identify sources of energy (e.g., food) for living things.		E			P								
	2.3.2 (2–7) Describe a food chain.			E					P					
	2.3.3 (1–6) Identify environmental conditions appropriate and inappropriate for plants and animals.		E					P						
	2.3.4 (5–10) Explain requirements of photosynthesis and respiration.						E					P		
	2.3.5 (5–10) Identify causes of disease, e.g., pathogens, stress, deficiency, radiation, toxins, and heredity.						E					P		
	2.3.6 (5–10) Describe the body's defenses against diseases.						E					P		
	2.3.7 (5–10) Explain the interactions of individuals and groups in ecosystems.						E					P		
	2.3.8 (7–10) Describe the flow of energy from the sun through living organisms, including producers, consumers, and decomposers.								E			P		
	2.3.9 (7–10) Outline the principal factors that may limit population size and distribution of plants and animals, including humans.								E			P		

2.4 UNDERSTAND THE PROPERTIES AND INTERACTIONS OF MATTER AND ENERGY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.4.1 (K–4) Identify the similarities and differences of solids, liquids, and gases.	E				P								
2.4.2 (3–5) Identify matter by its physical characteristics, e.g., hardness, bouyancy, vein patterns.				E		P							
2.4.3 (3–6) Know that energy is involved in a change of state.				E			P						
2.4.4 (4–6) Know that molecules are small particles whose presence may be detected by the senses.					E		P						
2.4.5 (6–11) Identify matter by its chemical characteristics.							E					P	
2.4.6 (5–9) Identify substances as elements, compounds, or mixtures.						E				P			
2.4.7 (6–9) State a word-model of an atom.							E			P			
2.4.8 (4–9) Give evidence for the particle nature of matter.					E					P			
2.4.9 (8–11) Give and uses of acids, bases, salts, oxides, and organic compounds.									E			P	
2.4.10 (7–10) Give examples of biochemical processes.								E			P		

2.5 UNDERSTAND THE CONCEPTS OF FORCE, MOTION, AND ENERGY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.5.1 (1–4) Know that Forces are required for the movement of objects.		E			P								
2.5.2 (5–9) Know that forces can change an object's shape, speed, or direction.						E				P			
2.5.3 (6–9) Give examples of kinetic and potential energy.							E			P			
2.5.4 (5–9) Give examples of fundamental kinds of forces, e.g., electrical, nuclear, mechanical, and gravitational.						E				P			
2.5.5 (6–9) Explain the concept of power (rate of using energy).							E			P			
2.5.6 (9–12) Demonstrate that mass in motion has momentum and energy.										E			P

2.6 UNDERSTAND MAJOR ENERGY TRANSFORMATIONS.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.6.1 (3–6) Identify devices that change energy from one form to another.				E			P						
2.6.2 (5–9) Identify how power production systems transform energy.						E				P			
2.6.3 (9–12) Describe an energy transformation in terms of the principle of conservation of energy.										E			P
2.6.4 (9–12) Relate energy transmission to wave and particle theory.										E			P

2.7 UNDERSTAND HEAT.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.7.1 (1-4) List sources of heat.		E			P								
2.7.2 (3-6) Compare heat conductors and insulators.				E			P						
2.7.3 (9-12) Describe heat and temperature in terms of kinetic molecular energy.										E			P

2.8 UNDERSTAND LIGHT.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.8.1 (1-4) List sources of light.		E			P								
2.8.2 (5-9) Describe how visible light behaves.						E				P			
2.8.3 (6-12) Describe the behavior of reflected and refracted light.							E						P

2.9 UNDERSTAND SOUND.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.9.1 (K-4) Describe how sound is produced.	E				P								
2.9.2 (3-6) Demonstrate differences of pitch, volume, and quality of sounds.				E			P						
2.9.3 (6-9) Explain how sound is transmitted through various media.							E			P			

2.10 UNDERSTAND ELECTRICITY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.10.1 (4–6) Identify sources of electrical energy.					E		P						
2.10.2 (2–5) Identify uses of electricity.			E				E						
2.10.3 (3–6) Describe the function of the parts of a simple electrical system.				E			E						
2.10.4 (6–9) Know how electric charges may be caused to move.							E			E			
2.10.5 (6–9) Construct series and parallel circuits.							E			E			
2.10.6 (6–9) Describe how the terms volt, ampere, watt, and kilowatt hour apply to household use.							E			E			

2.11 UNDERSTAND MAGNETISM.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.11.1 (K–3) Describe the characteristics of magnets.	E			P									
2.11.2 (6–9) Explain how magnetic fields are produced.							E			P			

2.12 UNDERSTAND THE PRINCIPLES AND CONCEPTS OF EARTH/SPACE SCIENCE.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.12.1 (K–7) Describe a current space exploration activity.	E							P					
2.12.2 (2–6) Measure and predict local weather.			E				P						
2.12.3 (4–8) Describe weathering and other types of erosion.					E				P				

2.12 CONTINUED	K	1	2	3	4	5	6	7	8	9	10	11	12
2.12.4 (4–8) Relate minor geological features of the earth's surface to the distribution of plants and animals.					E				P				
2.12.5 (5–8) Describe global and local weather patterns in terms of rotation of the earth, topography, and the movement of water and air masses.						E			P				
2.12.6 (4–8) Identify the processes which change the earth's surface.					E				P				
2.12.7 (6–8) Use scientific theories to explain geologic history.							E		P				
2.12.8 (4–8) Know motions of stars, sun, planets, and satellites.					E				P				
2.12.9 (4–8) Explain how the motions of heavenly bodies affect us, e.g., days, seasons, tides, and asteroid/meteor impacts.					E				P				
2.12.10 (4–8) Demonstrate how the positions of the sun, earth, and moon, explain phases of the moon, eclipses and seasons.					E				P				
2.12.11 (8–12) Explain how climate information is utilized in managing human activities.									E				P
2.12.12 (8–12) Describe scientific theories of the origin and evolution of the universe.									E				P
2.12.13 (8–12) Discuss benefits derived from the space exploration program.										E			P

3.3 PRACTICE CONSERVATION MEASURES.	K	1	2	3	4	5	6	7	8	9	10	11	12
3.3.1 (K-12) Identify pleasant and unpleasant conditions in the personal environment.	E												P
3.3.2 (K-12) Select ways to conserve or preserve the natural and built environment.	E												P
3.3.3 (K-12) Participate in activities that improve the environment.	E												P
3.3.4 (5-12) Defend limits on the use of natural environments.						E							P

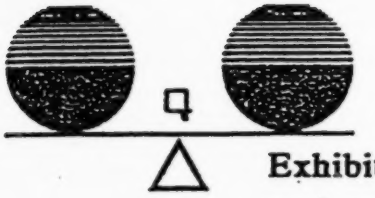


Exhibit scientific behavior in school and everyday life.

	K	1	2	3	4	5	6	7	8	9	10	11	12
4.1 UNDERSTAND THE BROAD HISTORY OF THE DEVELOPMENT OF SCIENTIFIC THOUGHT.													
4.1.1 (4–8) Describe how a science research group operates today.					E				P				
4.1.2 (7–10) Know how scientific inquiry has developed over time.								E			P		

	K	1	2	3	4	5	6	7	8	9	10	11	12
4.2 VALUE SCIENTIFIC PROCESSES.													
4.2.1 (K–12) Display appropriate safety procedures.	E												P
4.2.2 (4–7) Consider conflicting data when engaging in scientific investigations.					E			P					
4.2.3 (4–7) Seek alternative approaches to problems.						E		P					
4.2.4 (6–9) Recognize the limitations of a study.							E			P			
4.2.5 (6–9) Phrase conclusions of a study in tentative terms.							E			P			
4.2.6 (4–8) Distinguish between scientific and non-scientific explanations of phenomena.					E				P				

4.3 DISPLAY SCIENTIFIC ATTITUDES.	K	1	2	3	4	5	6	7	8	9	10	11	12
4.3.1 (K-12) Express curiosity.	E												P
4.3.2 (K-12) Demonstrate a continuing search for deeper understanding.	E												P
4.3.3 (K-12) Demonstrate respect for living things.	E												P
4.3.4 (K-12) Display confidence in ability to engage in scientific inquiry.	E												P
4.3.5 (K-12) Cooperate with others in science inquiry.	E												P
4.3.6 (5-8) Demonstrate a preference for a variety of sources.						E			P				
4.3.7 (5-12) Display reasonable skepticism of unsubstantiated conclusions.						E							P

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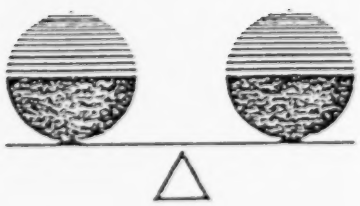

K-6 Learning & Time Allocation Guide

Department of Defense
Dependents Schools (DoDDS)

DSM 2000.8
December 1985

Foreword

This booklet contains the same essential objectives for student learning as those presented by the Department of Defense Dependents Schools (DoDDS) K-6 Learning and Time Allocation Chart (LATAC). Both are intended as aids for teachers in describing, in broad terms, the instructional program to persons unfamiliar with the dependents schools' curriculum. They may also be used to illustrate for parents or community groups the articulation of instructional programs among grade levels and subjects. A more complete listing of objectives for individual curriculum areas is available at each school.

Beth Stephens
Director.

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Mathematics (110)

- Organize pictures to demonstrate a sequence of events
- Use manipulatives to demonstrate one-to-one relationships by matching sets
- Use manipulatives to compare quantity terms that include many, some, few, all, none, as many as
- Recognize numerals 0 to 10 and trace numerals 0 through 20
- Manipulate objects to demonstrate one more, one less, and equal
- Identify geometric shapes (circle, square, triangle, rectangle, and oval)
- Identify simple space relationships (inside, outside, on, under, over)
- Sort objects by shape, size, color, and use
- Classify objects by common attributes
- Recognize a clock

Science (40)

- Identify the five senses
- Identify parts of the body
- Recognize basic animal characteristics
- Recognize basic plant characteristics
- Care for pets and other living things
- Perform simple metric measurement
- Demonstrate a curiosity about the environment and the seasons

(190)

Mathematics

- Determine whether addition or subtraction is needed to solve simple story problems
- Read, order, and write numerals 0 through 100
- Estimate whether a group of objects is less than or greater than 18
- Complete a sequence of numbers less than 100
- Add and subtract numbers 0 through 10 using the number line and other manipulative aids
- Compute addition and subtraction facts through 10 using horizontal and vertical notation
- Identify and draw geometric shapes: circle, square, triangle, rectangle, oval, and diamond
- Compare and arrange objects by size or weight
- Use available standard or non-standard measurement units to determine length and weight
- Observe, record, and graph information with teacher help

(100)

Science

- Use the senses to identify objects
- Distinguish living from non-living things
- Identify physical similarities and differences in living things
- Classify objects
- Identify the similarities and differences of liquids, solids, and gases
- Describe pleasant and unpleasant conditions in the personal environment
- Describe daily and seasonal changes in the community
- Identify sources of energy for living things

(240)

Mathematics

- Solve multistep word problems using a logical process
- Formulate word problems related to an everyday situation
- Identify reciprocals of fractions, whole numbers, and mixed numbers
- Compare mixed numbers or mixed decimals using symbols
- Estimate the product and quotient of fractional and decimal numbers
- Perform the four basic operations with decimals and whole numbers
- Add and subtract fractions and mixed numbers with like and unlike denominators
- Use a scale in map reading
- Find the area of triangles, parallelograms, trapezoids, and circles using formulas
- Interpret charts and tables to make inferences

(160)

Science

- Use scientific theories to explain geologic history
- Distinguish between renewable and non-renewable resources
- Give examples of fundamental kinds of forces
- Give evidence for the particle nature of matter
- Explain energy transformations in matter
- Describe personal activities to reduce pollution
- Distinguish between scientific and non-scientific explanations of phenomena

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
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August 11, 1987

PACIFIC

ERH/635-2267/303-11

MEMORANDUM FOR All Principals

SUBJECT: 1987-88 Approved Textbook Listing

Attached is the DoDDS-Pacific Approved Textbook Listing. It is organized by curriculum areas with titles, publishers and copyright dates.

These adoptions represent the only texts authorized for purchase and use as the core for basic programs in the Pacific Region schools. Previously adopted or supplementary texts will not be used in lieu of the authorized basic texts. As implementation of new programs becomes effective, excess previously adopted texts are to be removed from the school in accordance with existing disposal procedures when sufficient replacement copies of newly adopted texts have been received.

A maximum of 25 copies of a previously adopted text may be retained by the school. In addition, 25 copies of given supplemental texts may be purchased/used for enrichment or remediation. Any exception to this policy, to include textbooks for DoDDS-P approved course offerings not listed, must be authorized at the regional level, ATTN: Education Division.

Your suggestions as to improvements in the organization of this document are greatly appreciated.

Lee Davis

LEE DAVIS, Chief
Education Division

Enclosure:
DoDDS-Pacific Approved Textbook Listing

cf: Dist Supts

DoDDS-PACIFIC REGION

APPROVED TEXTBOOK LISTING

AS OF

AUGUST 1987

SCIENCE

Grade Level	Title	Publisher	Copyright Date
K	Addison-Wesley Science	Addison-Wesley	1984
1-6	HBJ Science	Harcourt Brace Jovanovich	1985
7	Focus on Life Science	Merrill	1984
7	Focus on Life Science: A Learning Strategy for the Laboratory	Merrill	1984
8	Focus on Earth Science	Merrill	1984
8	Focus on Earth Science: A Learning Strategy for the Laboratory	Merrill	1984
9	Focus on Physical Science	Merrill	1984
9	Focus on Physical Science: A Learning Strategy for the Laboratory	Merrill	1984
10	Biology: Living Systems	Merrill	1983
10	Biology: An Everyday Experience	Merrill	1981
10	Probing Levels of Life: A Laboratory Manual	Merrill	1983
10	Laboratory Biology: Investigating Living Systems	Merrill	1983
10	Biology: Laboratory Experiences	Merrill	1985
11	Chemistry: A Modern Course	Merrill	1983
11	Laboratory Chemistry	Merrill	1983
11	Solving Problems in Chemistry	Merrill	1983
12	Modern Physics	Holt, Rinehart and Winston	1984
12	Modern Physics: Exercises and Experiments in Physics	Holt, Rinehart and Winston	1984